ECG Tutor:
A Stand Alone Educational and Self Evaluation Tool for ECG Instruction

L. Pacelli, B.A., J. Rios, M.D., F.A.C.C., P. Pincetl, M.D.
The George Washington University Medical Center, Washington, D.C.

Teaching electrocardiography is very faculty intensive. The increasing complexity of cardiology, the limited curriculum time available and the expanding clinical demands on faculty time inhibits experts from adequately conveying this knowledge. A new methodology is warranted.

*We have developed a computer-assisted hypermedia tool called **ECG Tutor** to meet this need. This application, developed using Asymetrix's Toolbook software, operates on MS-DOS compatible 386sx (or higher) computers with SVGA graphics and 4 megabytes of memory. Development of this application incorporates object oriented programming using Asymetrix's OpenScript environment and uses a "D-Base3" database to access digitized patient ECG's.*

This application makes use of advancements in computer hardware and high resolution graphics to provide realistic ECGs to users. Learners are introduced to critical ECG interpretative information through hypertext based tutorials which rely on the digitized ECG information. The user is also allowed to interact with ECG images through: mouse activated regions on images, measurement of standard ECG intervals using the mouse cartesian coordinate positions, and self evaluation exams that incorporate multiple choice and freetext answers to questions based on the images as well as requiring correct measurement of intervals using the mouse.

*The modular design of **ECG Tutor** allows users to interact with the tool at any level of knowledge or clinical experience. The novice starts with very basic concepts such as the lead systems, wave forms, components of the wave, fundamentals of interval or amplitude measurement as well as axis calculation. Advanced users can access detailed explanations of ECG abnormalities using a graphic display of vectorial concepts that facilitate understanding. An inventory of practice ECG's is offered. Self- test sequences are available for each level of expertise.*

*In the final module, **ECG Tutor** presents patient cases which incorporate the digitized ECGs. These can be used to further evaluate the user's acquired knowledge.*

*Throughout the tutorial, the user's performance and interactions with the application are monitored and stored in a database file for later review. This information will be used in an iterative manner to refine the **ECG Tutor**.*

0195-4210/92/$5.00